

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

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WP 10-4

Airport Survey for Runway Clearing Events  
Performance Harmonization Sub-Group

Type of Airport      Hub or Spoke airport?

                             Number of carriers using airport?

                             Flights per day/ banks per day?

                             Maximum arrival rate?

Airport Configuration      Number of runways, length of runways, parallel runways?

Operation during restrictive weather conditions

                             number of runways in use?

                             arrival rate?

Typical Winter Weather      number of days that snow, slush or standing water impacted the operation?

                             Average inches of snow yearly?

What signals do you use to determine that runway clearing might be necessary?

                             What is the usual lead time?

Snow removal      Snow Plan?

                             what is done and in what order (plow, chemically treat?)

                             all runways closed, alternate closing runways?

                             Length of time involved?

                             Physical equipment, type of equipment and number used in runway clearing effort?

                             Is a friction measuring device used? How is it used (i.e. determine if runway should be cleared or measurement after clearing or just reporting runway condition via NOTAMs)?

                             Limitations of the snow removal operation?

What is unique to your airport?

What can be done to reduce the time that a runway is contaminated during flight operations? Or if your budget for snow removal was doubled, what impact would it have on snow removal operation?

Other comments

Please return to: Virginia Eades  
Trans World Airlines  
11495 Natural Bridge Rd. Room 431

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

Bridgeton MO 63044

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

Contaminated Runway Airport Survey

Airport	DTW	STL	JFK	LGA	EWR	YVR	ORD
<b>Type of Airport</b>							
Hub or Spoke	Hub	Hub	Hub	Hub	Hub	Hub	Hub
# scheduled carriers		25	88	23	52	44	
# flights a day		1400	933	1250	1027	880	1288
# banks a day		12				3	
Max arrival rate per hour		72				64	
<b>Airport Configuration</b>							
# runways	5	3	4	2	2	3	6
# runways > 10,000ft	2	1	3	0	1	1	3
Parallel runways	5	2	4	0	2	2	6
<b>Ops under bad weather</b>							
# runways used		3				2*	
Arrival rate		38-42				30*	
<b>Typical Winter Weather</b>							
# day of bad weather	53	93	10-30	10-30	10-30	4	48
Avg inches of snow yearly	19	19	15-40	15-40	15-40	21.5	28
<b>Signal to start runway clearing</b>							
Lead time in minutes		45	15-40				
<b>Snow Removal</b>							
Snow Plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time to clear in minutes	30					30*	
Use Friction measuring Device(s)?	Yes	Yes	Yes	Yes	Yes	Yes	
<b>Unique to this airport</b>							
Reduce downtime need more ?						Equipment	

DTW - Detroit, Michigan  
STL - St. Louis, Missouri  
JFK - Kennedy Airport, NYC, NY  
LGA - LaGuardia Airport, NYC, NY  
EWR - Newark, NJ

YVR - Vancouver, British Columbia \*Light sno  
ORD - Chicago, Illinois  
OMA - Omaha, Nebraska  
MSP - Minneapolis-St. Paul, Minnesota

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

Contaminated Runway Airport Survey

Airport	YHM	YYC	CLE	YYZ	YUL	YYB	YTS	
<b>Type of Airport</b>								
Hub or Spoke	Hub	Hub	Hub	Hub	Provincial	Spoke	Spoke	
# scheduled carriers	10	25	13	54	29	2	3	
# flights a day	100	670	1000	1300	500		75	
# banks a day		4	8	4				
Max arrival rate per hour	20	70	58	65	40		12	
<b>Airport Configuration</b>								
# runways	3	3	4	4	3	2	2	
# runways > 10,000ft	1	1	0	2	1	1	0	
Parallel runways	2	No	2	4	2	No	No	
<b>Ops under bad weather</b>								
# runways used	1	1	1	1 or 2	2	1	1	
Arrival rate	10	22-24	28-30	6 or >	15-20			
<b>Typical Winter Weather</b>								
# day of bad weather	60	30	91	20-25	45		125	
Avg inches of snow yearly	48	53	55	55-60	92	125	138	
<b>Signal to start runway clearing</b>								
Lead time in minutes	20	60-270	30	0	0	45	5 - 60	
<b>Snow Removal</b>								
Snow Plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Time to clear in minutes	30	20	45	30-60			45	
Use Friction measuring Device(s)?	Yes	Yes		Yes	Yes	Yes	Yes	
<b>Unique to this airport</b>	Cargo airport	Chinook		Rain-snow	Configuration	Alternate	6mts snow	
Reduce downtime need more ?	Equipment	Equipment	Personnel	Yes	Coordination	Personnel	No	

YHM - Hamilton, Ontario  
YYC - Calgary, Alberta  
CLE - Cleveland, Ohio  
YYZ - Toronto, Ontario

YUL - Montrea, Quebec  
YYB - North Bay, Ontario  
YTS - Timmins, Ontario  
YXC - Cranbrook, British Colombia

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

**Contaminated Runway Airport Survey Responses**

**DTW – Detroit Airport, Michigan**

DTW is a hub airport with five runways. There are two sets of parallel runways. Runway 3C/21C is 8,500 ft., 3L/21R is 12,000 ft and 3R/21L is 10,000 ft. Runways 9L/27R is 8,700 ft and 9R/27L is 8,500 ft. NOAA data <sup>1</sup> reports about 53 days of .01 inch of snow a year with the average total snow of **19 inches**. During restrictive weather conditions, DTW begins snow removal on Runway 3L/21R or 9R/27L depending on wind direction. However their clearing schedule states that runway 3L/21R will be cleared first, 3C/21C second, 3R/21L third and 9R/27L last. 9L/27R is only cleared if cross wind runways have priority.

DTW used four weather monitoring systems to monitor weather 24 hours a day. When accumulations have reached ¼ inch of dry snow or ½ inch of wet snow, snow removal operation begins. They have a Snow Plan.

The airport utilizes eight snow plows, with two in reserve; five blowers, with two in reserve; two runway brooms, with two in reserve; two runway deicer trucks; three sand spreader trucks, with one in reserve and various other equipment. Runway closures are limited to 30 minutes. A friction tester is utilized during snow and ice conditions.

**STL Lambert-St. Louis International Airport, Missouri**

STL is a large hub airport with 25 carriers. There are about 700 departures per day and an arrival rate of 72 per hour. There are three main runways, parallels 12R/30L length 11,019 ft and 12L/30R length 9,003 ft and runway 6/24 length 7,602 ft.

STL operates 3 runways during restrictive weather conditions at an arrival rate of 38 to 42 aircraft an hour. In 1998, STL had 120 days with greater than .01 inches of precipitation, 80 days with greater than .1 inches of precipitation, 6 days with greater than 1 inch of precipitation and 7 days with greater than 1 inch of snowfall. Average snowfall is **19 inches** a year.

STL enclosed their Snow Plan. They respond within 45 minutes to snow events. They apply liquid deicer to runways and taxiways when the temperature is forecast to drop below freezing. If icing occurs, heated sand is applied. Wet snow is considered the most critical condition.

Data on field conditions is accumulated by monitoring FAA ground control for pilot reports, visual inspection and K. J. Law Runway Friction testing of runways. Equipment used for snow removal consists of 23 heavy duty trucks with high speed roll-over plows, 7 snow blowers, 13 runway brooms, 7 de-icers, 2 front loaders, one road grader, one crawler tractor and one salt spreader for runways. Additional equipment and personnel is available from the Missouri Air National Guard and a contractor (used mainly for ramp areas and roadways).

Field condition reports include information on plowing, sanding and de-icing operations in progress on runways, approximate depth of snow, type of snow, vehicle braking action, Friction coefficients from K. J. Law Friction Tester, and braking action reports from pilots.

**Port of New York, JFK, LGA and EWR airports**

All three airports are hub airports. JFK has 88 carriers. There are 933 operations a day at JFK. JFK has two pairs of parallel runway (4R/22L length 8,400 ft and 4L/22R length 11,351 ft) and (13L/31R length 10,000 ft and 13R/31L length 14,572 ft).

LGA has 23 carriers and 1250 operations a day. LGA has two main runways 4/22 and 13/31, both are 7,000 ft.

EWR has 52 carriers and 1027 operations a day. EWR has runway 4R/22L length 9,980 ft which is primary used for landing and runway 4L/22R length 10,000 ft.

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<sup>1</sup> National Oceanic and Atmosphere Administration, “International Station Meteorological Climate Summary”

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

The New York area normally has 10 to 30 days of snow or ice. Standing water is not an issue since all runways are crowned and grooved to allow for proper drainage. The average snowfall annually is from **15 to 40 inches**.

All three airports have Snow Plans which the Port of New York preferred not be shared. However they did mention that ordinarily each airport will anti-ice runway and taxiway surfaces with chemicals before snow begins to fall. Then will begin brooming operations to keep runways free of snow. Plows and blowers will then be used as needed.

The airports strive to keep all runways open at all times by alternately closing runways for snow removal. Each airport has a SAAB friction tester which is used to decide on runway closing for treatment (i.e. sand, chemicals, plowing). They report the friction results to the ATC tower for the pilots information.

YVR – Vancouver, British Colombia

YVR is a hub airport serving 44 carriers. There are 880 flights per day (winter) in three banks. The maximum arrival rate is 64 flights per hour VFR and 44 per hour IFR. YVR has three runways. Two parallel east-west are 11,000 ft and 9,940 ft. The northwest-southeast crosswind runway is 7,300 ft. x 200 ft.

YVR operates on three runways with arrival rate of 35 per hour in anti-icing conditions, two runways at 30 per hour in light snow, two runways at 20 per hour in moderate snow and one runway at 8 to 10 per hour in heavy snow. Average snow fall yearly is **21.5 inches** with four days a year of impacted operation.

YVR uses 24-hour weather monitoring, runway inspections and PIREPS to forecast the need for runway clearing. They have Snow Plan. When runway clearing is necessary under anti-ice conditions a combination of potassium and Sodium Acetates are applied. During light snow fall, surfaces are kept bare and wet using high speed brooms and additional application of de-icing chemicals. During moderate and heavy snow falls, surfaces are swept, plowed and blown followed immediately by chemical applications to maintain surfaces in a bare and wet condition.

During light and moderate snow conditions, the crosswind runway is closed and the parallel runways are closed on an alternating basis duration of about 30 minutes. In moderate snow the duration of the closure is about 30-45 minutes. During heavy snow fall conditions the airport maintains a single runway operation, with the runway open for 45 minutes then closed for 45 minutes.

Equipment available are three high speed brooms, seven plow trucks, three snow blowers, one liquid and one granular chemical spreader. A friction measuring device is used immediately after snow removal operation.

YVR is unique in that it averages only three or four winter events but has over 21 inches of snow a year. Equipment and resources are typically allocated on the frequency of snow events not the average snow fall. If the budget for snow removal was doubled, the airport would purchase more equipment but not need additional manpower and could improve performance standards in snow events.

ORD O'Hare International Airport, Chicago, Illinois

ORD sent a copy of their Snow Removal Plan. The following information is from the 1998-99 plan.

Estimated departures in October 1998 are 1288 daily. ORD has six runways, 3 sets of parallel runways. Runway 4L/22R 7,500 ft., 4R/22L 8,071 ft., 9L/27R 7,967 ft., 9R/27L 10,141 ft., 14L/32R 10,003 ft., and 14R/32L 13,000 ft.

NOAA data<sup>1</sup> reports about 48 days of .01 inch of snow a year with the average total snow of **28 inches**.

A snow alert will be called when anticipated snow conditions are within 2 to 3 hours. The intensity of the predicated weather is classified in four levels. Variables considered in calling an alert are: wind direction, lake effect (northeast wind off the lake), temperature, time of day, prediction and duration of accumulation. Equipment used for runway clearing varies with the type of alert, with a high of 161 vehicles. This equipment includes brooms, plows, blowers, deicer trucks loaders, salt spreaders, sanders and snow melters. Liquid deicer is applied to runways, taxiways and ramps. Heated sand is applied to taxiways and ramps and only as a last resort to runways.

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

OMA - Omaha, Nebraska

OMA is a spoke airport serving 18 airlines and cargo carriers. There are about 100 flight per day. Maximum arrival rate is 57 flights per hour. OMA has three runways. There are parallel runways, 14R/32L 9,500 ft. and 14L/32R 4,060 ft. Runway 18/36 is 8,153 ft. One or two runways are in use during restrictive weather conditions. There are a minimal number of days when the operation is restrictive by weather. Approximately **30 inches** of snow fall a year.

OMA uses weather and pavement forecasts, runway inspections and friction measurements to determine runway clearing. They usually have a one to two hour lead time. OMA has a Snow Plan. Runways are cleared by brooming, plowing and chemical treatment. Runway are not closed, snow removal is completed between flights. Length of time to clear snow varies. Equipment used are four brooms, seven plows, three blowers, two deicer trucks, one sand truck and a loader. A Tapley decelerometer friction tester is used prior to and during winter precipitation. Runway conditions are reported to ATC and in NOTAMs. OMA feels that they can adequately handle snow removal operations.

MSP – Minneapolis-St. Paul, Minnesota

MSP provided a copy of some pages from their Snow Plan. They have three runways, 4/22 11,000 ft.; 12L/30R 10,000 ft. and 12R/30L 10,000 ft. They have two parallel runways. NOAA<sup>1</sup> data reports about 95 days of .01 inch of snow a year with the average total snow of **38 inches**. MSP is a hub airport. MSP will determine the need for snow removal operations from weather information on a forecast snow/ice event. The airport subscribes to two weather services. Reports from the 18 in-pavement runway surface sensors used to determine temperatures. (The sensors system also monitor chemical effectiveness.) About 20 pieces of heavy equipment is used to clear runways. A runway is typically closed for 30-35 minutes for plowing. A friction tester is used to measure the slipperiness of the surface. Combating ice/snow compaction is a major concern. The Snow Plan outlines the use of runway brooms, chemical application and motor graders to remove compacted snow/ice from runways.

YHM – Hamilton, Ontario

YHN is a hub airport serving 10 carriers. There are 100 flights a day with a maximum arrival rate of 20 per hour. There are three runways, 2 of which are parallel. The lengths are 10,000 ft, 6,000 ft and 3500 ft. The airport is impacted by weather conditions about 60 days a year with an average snow fall for **48 inches** yearly. During restrictive weather conditions, one runway is used and arrival rate is 10 flights per hour. Runway clearing begins when trace snow, ice or slush is seen. YHM has a snow plan. They plow and sweep runways then use blower and treat with a chemical if need.

Runway are closed alternately for 30 minutes duration. One to three snowplows and brooms are used, plus two snow blowers, and two sanders. A friction testing device is used after any change in contamination on the runway.

YHM is a cargo airport. If they had more equipment, their down time for snow removal would be improved.

YYC – Calgary, Alberta

YYC is a hub airport with 25 carriers; 14 scheduled, 5 charter and 6 cargo. There are 670 flights a day in 4 banks. Maximum arrival rate is 70 aircraft per hour (VFR). YYC has three runways, none are parallel. Runway 16/34 is 12,675 ft, 10/28 is 8,000 ft and 7/25 is 6,200 ft.

During restrictive weather conditions one runway, 16/34, is used. Arrival rate is 22 to 24 aircraft an hour. Typical winter weather will have 55 days of snow with a yearly average of **53 inches**. YYC monitors several weather forecasting systems, the surface temperatures, air temperatures, type of precipitation and pilot braking comments to decide when runway clearing is necessary. The usual lead time is one to three hours. YYC does have a Snow Plan. They use chemicals then plow and sweep when snow has not yet accumulated. Once accumulation has started, plows and sweepers are used first then runway is chemically treated. During icing conditions, the runway is chemically treated then swept and chemically treated again.



PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

A 20 minute closure every hour is projected for runway clearing. During that time, two blowers, five trucks and sweepers, a chemical truck, and a ram hog are used. When no chemical treatment is done, one backplow, four sweeper truck combinations and two blowers and three ram hogs are used. A friction measuring device is used to determine if snow removal or chemical application is necessary. After snow removal, the friction tester is used to determine additional procedures and to report runway conditions via NOTAMs.

YYC has Chinook weather condition during the winter months. They also are relatively high, 3557 ft altitude. However they do have a very long runway, 12,675 ft.

YYC made a comment that what would improve their snow removal process would be to increase the speed and capacity of snow clearing equipment. I think other airports who commented that increase in the amount of equipment would not help would agree that increase in speed and capacity would help.

Comment from YYC, "TC, FAA and Airlines should use caution when correlating runway condition to aircraft performance. In Canada we have snow covered strips, ice runways yet in Southern Canada and USA we insist on bare dry conditions. In other words aircraft have the ability to arrive and depart on contaminated runways."

CLE Cleveland-Hopkins International Airport, Ohio

CLE is a hub airport serving 13 carriers. There are 500 arrivals and 500 departures a day in 8 arrival banks and 8 departure banks. The maximum arrival rate is 58 aircraft per hour. There are four runways; 18/36 length 6415 ft, 10/28 length 6015 ft, 5R/23L length 8999 ft and 5L/23R length 7096 ft. Two parallel runways.

CLE operates one runway during restrictive weather conditions with an arrival rate of 28 to 30 aircraft per hour. The experience about 91 days a year when snow, slush or standing water impacts the operation.

Average snowfall amount is **55 inches** a year.

CLE starts runway clearing when wet snow accumulates to ½ inch or dry snow to 2 inches in depth. The usual lead time is about 30 minutes. They have a Snow Plan. A broom is used to clear and then the runway is chemically treated. It takes approximately 45 minutes to clear the runway. The airport has about 100 pieces of snow removal equipment which includes brooms, plows, blowers and tandems. They are limited by the ability to cross active runways in a timely manner to continue snow removal operations. If the airport had double the personnel they feel they could cut the runway closure times in half.

YYZ – Toronto, Ontario

YYZ is a hub airport serving 54 carriers. There are 1,200 to 1,300 flight per day in four banks. The maximum arrival rate is 65 flights per hour. There are two east/west parallel runways, 5/23 11,200 ft and 6R/24L 9,500 ft. There are two north/south parallel runways, 15L/33R 11,050 ft and 15R/33L 9,088 ft. A new runway, 6R/24L, is planned to replace current runway with that designation. It will be 9,000 ft. Current 6R/24L will be renamed 6L/24R.

During restrictive weather conditions, one or two runways are used. The arrival rate can drop as low as 6 per hour. YYZ has 20 to 25 days of restrictive weather and **55 to 60 inches** of snow annually. They use in-ground pavement temperature and condition sensors; visual observations, weather radar and Pireps to determine when runway clearing might be necessary. Clearing is started immediately after the decision is made as equipment is ready and crews on stand-by.

YYZ has a Snow Plan. During some storms, runways are pre-treated with Potassium Acetate. One runway is taken out of service at a time for 30 to 60 minutes. The equipment employed are six Vammas PSB's and three high speed/high capacity snow blowers. Also used are Potassium Acetate sprayer, Sodium Formate spreader, sand truck and a friction measuring vehicle. Friction measurement and runway condition reports are issued upon completion of snow removal.

Toronto's Pearson Airport is situated very close to three of the five Great Lakes. This moderates temperature and increases moisture. As a result, most storms include periods of rain, freezing rain and snow. This complicates the snow removal and clean up operations.

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

YYZ reports in the last three winters they have decreased runway clearing time from as much as two and one half hours to sixty minutes. This winter's goal is 30 minutes. To do this they need to clear the runway(s) more frequently. Without regular access to the runway for removal activities, snow accumulations continue to mount and total clearing time increases. YYZ mentions that Air Traffic Control and the Air Carriers must be cognizant of this requirement. Increasing the snow removal budget would help further to reduce the clearing time.

YUL - Montreal (Dorval), Quebec

YUL is a hub type airport. They regard themselves as a provincial airport. It serves 29 carriers, with 500 operations a day. General aviation accounts for 20 to 25% of the flights. Maximum arrival rate is 40 flight per hour. There are three runways with two parallel runways, 6R/24L 9,600 ft and 6L/24R 11,000 ft. Runway 10/28 is 7,000 ft.

During restrictive weather conditions, YUL tries to keep the parallel runways open. Runway 6L is always opened first. Arrival rate is from 15 - 20 flights an hour. Winter weather affects 45 days every winter with an average snow fall of **92 inches**.

From November 15, YUL is poised for snow removal. A minimum snow removal stall is on duty. When perception is forecast, inspections of the airfield are increased. "We are therefore capable of beating 99 % of the weather." Additional snow remove staff are on standby. The basic snow removal philosophy is to maintain the airport in a blacktop condition at all times.

YUL has a Snow Plan. Equipment available for snow removal includes 10 snowplows, 6 spreaders, 11 snow blowers, 3 tractors, one backhoe, 4 loaders, one bulldozer, 3 graders, and 10 runway sweepers.

YUL has a few limiting factors such as the distance of the equipment in the garage to the airfield.

Relocation, which they are trying to do, would provide more rapid service. Also the airport configuration is a limiting factor. Runways can only be accessed via crossing many taxiways and creating delays due to traffic. The apron is relatively small and requires snow be transported immediately to a snow dump. This slows down the clearing process.

"We consider that the key elements to good snow removal operation, over and above the equipment and good monitoring, is the cooperation of all, especially of Air Traffic Controllers. Any unnecessary delay in obtaining clearance to clean a runway, has such a backlog effect on snow removal effectiveness of an airport, that it must be kept to a bare minimum."

Additional budget money would not help. Instead YUL suggests coordination and education of all involved parties is the key. They have a Snow Committee and a Snow Desk and have seen great benefits from this increased coordination.

YYB – North Bay, Ontario

YYB is served by two scheduled airlines. They however have several private couriers along with Med-o-Vacs, private carriers and private smaller aircraft. The airport operates seven days a week from 0645 to 2200. There are two active runways, one 10,00 ft and other 4,475 ft.

During restrictive weather conditions the 10,000 ft runway is cleared. However if prevailing winds require the other runway must be cleared instead. An average snow fall over the last four years, 1995/1996 season through 1998/1999 season, is **125 inches**. But the range is from 83 one season to 172 another season.

YYB uses the CRFI (Canadian Runway Friction Indexing) to determine when runway clearing should begin. If the CRFI value drops below .40, clearing is started. The lead time to begin clearing is usually 45 minutes. YYB does have a Snow Plan. Three single axle plow trucks, one tandem plow truck, two sweepers, two self-propelled blowers, one portable blower, two loaders, two sand trucks one grader and two ramp hogs are used for snow removal. In freezing rain, sand or urea treatment will be used. An Electronic Recording Decelerometer (ERD) friction measuring device is used. YYB could speed up snow removal if addition personnel could be hired.

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

YTS – Timmins, Ontario

YTS is a regional airport with a hub to the Northern communities and a spoke to Toronto. There are three scheduled carriers plus charter carriers, Med-o-vacs and corporate flights. They average 75 flights per 12 hour day. There are two runways, one 6,000 ft and other 4,903 ft. Both runways are available normally during restrictive weather. YTS averages 125 days of snow in the six month winter season and **138 inches** of snow a year. They have a Snow Plan.

When snow exceeds 1 inch, or freezing precipitation, frost or when poor braking is reported, runway clearing begins. The lead time before clearing begins is 5 minutes during operational hours and 45 minutes to one hour after hours. Two tandem trucks with plows and a sweeper operate in a conga-line and push snow to outer edges of runways, aprons and taxiways. Snow blowers remove this snow. It has only been necessary to close both runways once in the last ten years. Runway 3/21 can be cleared and opened in 45 minutes.

Equipment used includes one tandem truck with 22 foot reversible plow, one tandem truck with plow and wing, one single axle truck with plow and wing, three runway sweepers towed by trucks, two high capacity snow blowers (5,000 tons per hour), two large loaders with snow buckets and ramp hogs, and one high speed sand/chemical spreader. A friction tester is used.

YTS reports that the airport is unique because they experience six months of snow, freezing rain, frost down to eight feet, temperatures down to -45 F with severe wind chill values. Temperatures warm to above zero in the middle of January with rain. Then fall back to below -30 F within a day. “We can move snow till the cows come home but freezing precip in the middle of winter is considered a challenge to my airfield maintenance specialists.” Increasing snow removal budget would allow for more staff to be hired and extend daily hours of operation.

YXC – Cranbrook, British Columbia

YXC is a spoke airport serving three carriers with eight flights a day. There is one runway, 6,000 ft. long. They average **150 inches** of snow yearly. Runways are cleared when an inch or more of snow, or freezing rain on ½ inch or slush is forecast. There usually is 2 hours of lead time. They have a Snow Plan.

Equipment available is a plow with sweeper, backup truck and plow, snow blower, truck with spreader and tractor with urea spreader. A friction measuring device is used.

YXC very seldom gets major snow dumps. Instead there is a continuing snow accumulation which can be removed. Also there is an hour and half to two hour window between flights.

SUMMARY

Eighteen Airports responded to the survey letter. Nine were U.S. airports and nine Canadian airports. The responding airports varied greatly in size of operation, airport configuration, number of days that weather impacts operation and amount of snow yearly. In generalities, all the airports attempted to remove snow, slush and ice as quickly as possible. They all had Snow Plans and many sent all or a portion of their Snow Plan. Also all airports responding had and used a friction measuring device. This measurement was usually reported in the NOTAMs.

A few comments that stood out were the runway and taxiway configuration could slow down removal efforts, higher speed equipment would aid in removal, and cooperation between the airport, ATC and airlines would be the biggest help in improving down time. Not very many airports felt that more funds were the answer to improving runway clearing time.

Methods and criteria for clearing runways varied. Airports with more operations had more equipment and a shorter lead time. Airports with more snow events were of course more prepared. However airports with fewer operations had the advantage of more lead time before a flight and more time for runway clearing between a flight. The result was no impact on the operation.

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

I wish the Survey had included questions concerning the airport's knowledge of takeoff penalties which the airline incur in contaminated and wet runway situations. Also that the survey addressed what time delays were being required of departing flights. The philosophy of the Snow Plan seems to be remove contamination as quick as possible, keep runway closure time to a minimum and report a friction level which is agreeable to the airline and therefore provide for flights that are landing. Of course, landings should have priority over departures but I was unable to determine if airports had a feel for weight penalties which were being required of the airline.

The difference between reality and the Snow Plan cannot be determined from the Survey. Capt. Lutz believes that a burden to reduce and/or eliminate the contaminated penalty should be the responsibility of the airport, not the airlines. That aggressive activity should be exerted to keep a runway clean to the point where it is the equivalent of wet. The FAA should monitor and enforce these standards.

From TWA's point of view, two problems remain. One is the exactness of the data provided by the manufacturer and the inexactness of the reported contamination. A second problem is the delay time between when decision must be made about the payload and the actual time of departure. Neither seem to be a problem with an easy solution.

January 4, 2001

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

The following are comments submitted by Captain Terry Lutz, Air Line Pilots Association, Int'l Operational Test & Evaluation Group and member of the ARAC Performance Harmonization Working Group:

Airport operators are responsible for runway clearing during contaminating snow events. Specific guidance is provided in FAR 139.313 which reads:

139.313 Snow and ice control.

- (a) Each certificate holder whose airport is located where snow and icing conditions regularly occur shall prepare, maintain, and carry out a snow and ice control plan.
- (b) The snow and ice control plan required by this section shall include instructions and procedures for -
  - (1) Prompt removal or control, as completely as practical, of snow, ice, and slush on each movement area;
  - (2) Positioning snow off of movement area surfaces so that all air carrier aircraft propellers, engine pods, rotors, and wingtips will clear any snowdrift and snowbank as the aircraft's landing gear traverses any full strength portion of the movement area;
  - (3) Selection and application of approved materials for snow and ice control to ensure that they adhere to snow and ice sufficiently to minimize engine ingestion;
  - (4) Timely commencement of snow and ice control operations; and
  - (5) Prompt notification, in accordance with § 139.339, of all air carriers using the airport when any portion of the movement area normally available to them is less than satisfactorily cleared for safe operation by their aircraft.
- (c) FAA Advisory Circulars in the 150 series contain standards for snow and ice control equipment, materials, and procedures for snow and ice control which are acceptable to the Administrator.

[Docket No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4258, Feb. 12, 1988]

Advisory Circular 150/5200-30A contains amplifying instructions for the requirements of FAR 139.313. Under Paragraph 7, **Safety Requirements**, a. Airport Operator, the AC states: "An operator has a major duty to ensure the safety of operations at his facility." It also states that "Snow, ice, and slush should be removed as expeditiously as possible to maintain runways, high speed turnoffs, and taxiways in a "no worse than wet" condition."

For the above guidance to have maximum impact, the air carriers serving specific airports must be involved in reviewing the snow plan. In particular, air carriers must make airport operators aware of the operational impact of contaminated runways, including making airport operators aware of specific arrival and departure times when runways must be kept clear. Second, the FAA must remain an active participant by monitoring the performance of airport operators during actual snow events, to see if snow plans are properly executed, and that the condition of the runways are accurately reported.

At present, Airport Operators do not consider AC 150/5200-30A any more than simply guidance. Until the FAA regulates the condition of runways as a function of safety, we will continue to operate in winter with widely varying runway conditions. This is not the consistent level of safety we all desire, and puts extreme pressure on

PERF HWG Subgroup 2 Report  
Contaminated Runway  
Runway Clearing and Condition Reporting

operators and pilots to operate when exact runway performance cannot be guaranteed. The FAA should update the requirements of FAR 139.313 to require that runways, including runway ends, high-speed turnoffs, and taxiways (consistent with the AC, and where the highest number of departures occur), be maintained in a “no worse than wet” condition. Only then will Airport Operators aggressively seek the tools, methods, and cooperation they need with all parties to enhance the safety of winter operations.